



CLINICAL OUTCOME OF PLATELET RICH PLASMA (PRP) INTRA-ARTICULAR INJECTION IN EARLY KNEE OSTEOARTHRITIS

BY

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Abstract

Background

Platelets have an important role in tissue homeostasis as well as tissue healing and restoration. This is due to the fact that platelets contain a large number of growth factors, cytokines, and bioactive proteins. Studies have shown that PRP techniques have helped increase cell proliferation, migration, differentiation, inflammation mediation, and matrix synthesis.

AIMS:

To evaluate the clinical effects of intra-articular injection of platelet-rich plasma in osteoarthritis knee and to study the efficacy of platelet-rich plasma (PRP) in a cohort.

METHOD:

100 patients presenting to the Orthopaedics outpatient department with symptomatic knee osteoarthritis of grade 1-3 of Kellgren-Lawrence classification were selected for the study. All the selected patients, out of which 54 were male and 46 were female, were treated with three intra-articular injections of autologous platelet-rich plasma (PRP). These patients were followed up for a minimum period of 12 months.

RESULT :

At present treatment the mean WOMAC score was lowest in grade 1 patients while it was highest in grade 3 patients. The mean value of grade 1 WOMAC score was 76.269, while it was 77.830 for grade 2 and 78.143 for grade 3. This signified that the more advanced was the disease the more pain stiffness and alteration of physical function was perceived by the patient. Furthermore, in post-treatment evaluation the mean WOMAC score in grade 1 reduced to 38.43, grade 2 reduced to 47.617 after 12 months. However there was no such decline in WOMAC score of grade 3 patients, implying no much improvement in advanced stage of disease.

CONCLUSION:

PRP was a safe method of treatment as it induced no adverse effects amongst the study population.

It is therefore safe to conclude that PRP is a safe, simple, economic and efficacious modality in the treatment of osteoarthritis.

swelling, and stiffness.¹

Osteoarthritis is defined pathologically, being distinguished by focal areas of loss of articular cartilage within a synovial joint, accompanied by sclerosis of the underlying bone and varying degree of change in other joint tissues.²

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INTRODUCTION

Around the world, osteoarthritis is the foremost cause of physical morbidity. It also causes a marked decrease in quality of life. Patients present with specific symptoms of pain,



The various non invasive treatment methods available for osteoarthritis aim towards improving the overall quality of life of the patient by focusing on pain management and function improvement. Moreover, it also focuses on modifying the disease process as well as the progress of cartilage degeneration. These treatment methods include the use of medications as well as physical therapy³. Medications recommended are analgesics⁴, steroid and non steroid anti-inflammatory drugs⁵, glucosamine/chondroitin supplementation⁶, and hyaluronic acid injections.⁷ Unfortunately, most of these have shown only short-term efficacy with significant side effects. Therefore, new experimental studies have been underway in order to target the biological pathology responsible for osteoarthritis, and focus on promoting cartilage repair.³⁻⁷

Platelet-rich plasma is defined as blood plasma enriched with platelets.⁸ Platelets are irregularly shaped cell fragments that are derived from the precursor megakaryocytes. They even contain various growth factors. Thereby, PRP is an autologous preparation containing concentrated bioactive factors.⁸⁻⁹ The growth factors present in PRP include vascular endothelial growth factor-beta (VEGF- β), platelet-derived growth factor (PDGF), and transforming growth factor-beta (TGF- β).¹⁰

Material and methods

The present study was conducted in the department of orthopedics at MGMMC & LSK Hospital over a period of 2 years(September2022-April 2024). The study included 100 patients with symptomatic knee osteoarthritis of grade 1-3 of kellgren-Lawrence(KL) classification who gave consent for participation in the study.

Inclusion criteria:

- 1) Age of patient b/w 30-80 years
- 2) Grade 1-3 OA
- 3) Symptoms >3 months

Exclusion criteria:

- 1) Patient previously treated with PRP, Steriod injection, Hyaluronic acid in past 6 months
- 2) Patient with inflammatory disorder of the joints
- 3) Patient with diabetes or patients who are immunocompromised
- 4) Patient with grade 4 OA

TECHNIQUE

Procedure and preparation of PRP was done using the double spin method as follows.20 ml of venous autologous whole blood was collected via blood draw into tubes containing tri-sodium citrate as anticoagulant.The collected blood was then spun down using autologous platelet separator system at 1000rpm for duration of 10 minutes.This yielded a PRP layer at bottom of the tube and calcium gluconate wqs added to act as an activator of PRP.

Under aseptic conditions,the injection procedure was carried out in the operation theatre.The patient was placed in sitting position on the OT table with knee flexed to 90 degrees.The

procedure site was painted and draped with povidine-Iodine solution. A 24-gauge needle was attached to a 10 ml syringe filled with the PRP preparation composed of 8 ml of platlet rich plasma mixed with 1 ml of calcium gluconate.Injection site lied one cm proximal to the tibial plateau and lateral to the patellar tendon.It was felt as a soft spot .Keeping all aseptic precautions, the injection was given and covered with sterile bandage. Two further PRP injections were given to the patient following the same protocol after an interval of 1 month each

Follow up was taken 1,2,6, and 12 months , during which the pain scores were evaluated using VAS and WOMAC scoring system. During the study,there was loss to follow up in 20 patients, so data analysis was carried out to 80 patients.

RESULTS

Out of 100 patients 55 % were male and and 45% were females,of which in 56.25% cases Right knee was involved and in 43.75% left knee was involved .

Majority of the patients belonged to KL grade 1 (58.75%), grade 2 (32.5%) And grade 3 (8.75%)

At present treatment, the mean WOMAC score was lowest in grade 1 patients while it was highest in grade 3 patients.The mean value of grade 1 WOMAC score was 76.269,while it was 77.830 for grade 2 and 78.143 for grade 3.This signified that the more advanced was the disease, the more pain, stiffness and alteration of physical function was perceived by the patient. Furthermore, in post treatment evaluation the mean WOMAC score in grade 1 reduced to 38.43 ,grade 2 reduced to 47.617 after 12 months. However, there was no such decline in WOMAC score of grade 3 patients, implying no much improvement in advanced stage of disease.

At pre treatment,the mean VAS score in grade 1 was 4.885, almost similar in grade 2 was 4.851 and in grade 3 was 5.571 ,signifying pain perceived by patients worsens as disease advances .In post treatment evaluation, the mean VAS score declined in grade 1 to 1.423 and in grade 2 to 1.723 after 12 months of treatment. There was no significant improvement in grade 3 patients .

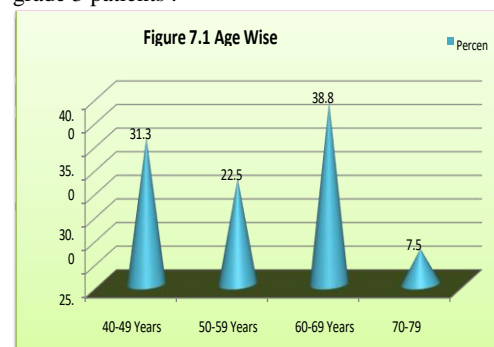
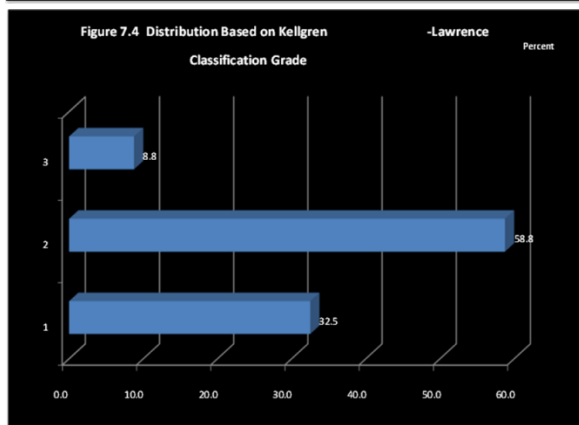
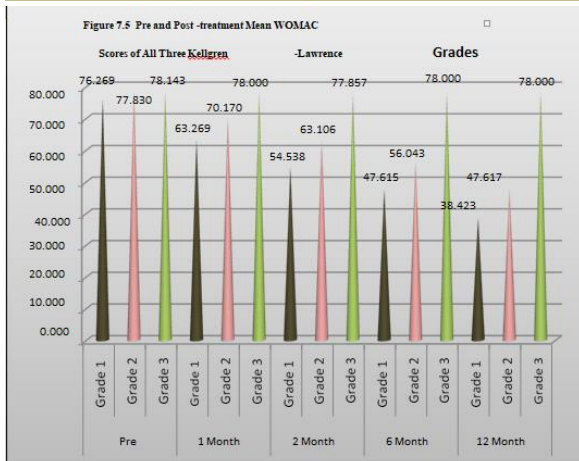
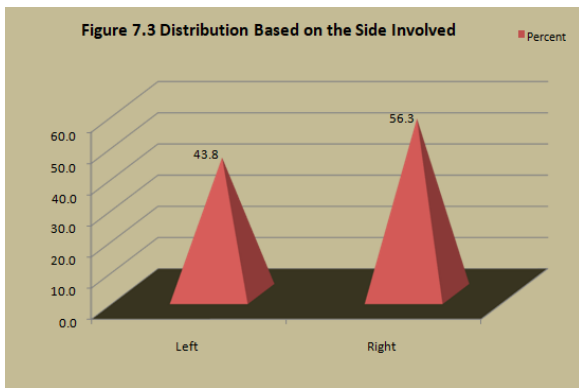


Figure 7.2 Gender Wise Distribution



DISCUSSION

The first aim of this study was to evaluate the clinical effects of intraarticular injection of platelet rich plasma in osteoarthritis of the knee joint. In order to assess this, all study participants were subjected to pretreatment and post-treatment pain evaluation with the help of both WOMAC and VAS scoring systems. In all the three grades of osteoarthritis, a significant decline was seen in the mean WOMAC and VAS scores at each subsequent follow-up visit.

This signified that an improvement in the patient symptomatology (bansal et al) 11,12,13- pre treatment values ($p < 0.05$).

The second aim of study was to study the efficacy of PRP therapy in cohort study. This treatment was found to be extremely safe. In similar study conducted by paterson et al¹⁴, no adverse effects were seen except for 2 participants having

minor pain and swelling which would rather be due to injection technique rather than PRP therapy. Another study by Huang et al¹³ showed no major side effects.

CONCLUSION

Osteoarthritis is a degenerative joint disease in which changes are seen in the articular cartilage of the joint. This study aimed at evaluating the efficacy and safety of intraarticular autologous platelet-rich plasma therapy in symptomatic patients of osteoarthritis knee. The results obtained concluded that injection of autologous PRP is indeed an effective treatment modality for osteoarthritis. It had satisfactory effects in reducing pain and stiffness, as well as in restoring joint function. This led to an improvement in the lifestyle of the patients, by enabling them to resume their activities as before. Moreover, PRP was a safe method of treatment as it induced no adverse effects amongst the study population. It is therefore safe to conclude that PRP is a safe, simple, economic, and efficacious modality in the treatment of osteoarthritis.

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